

# Pulse Rate & Blood Pressure Lab

## Purpose of this lab:

To examine the pulse, determine the pulse rate, measure blood pressure, and investigate the effects of body position and exercise on pulse rate and blood pressure.

## Materials:

1. Clock or watch with second hand, phone timer
2. Sphygmomanometer
3. Stethoscope

\*\*Remember you need to take both a pulse rate and a blood pressure reading as per condition.

## Procedure A—Baseline Values

### Pulse Rate

Examine your lab partner's radial pulse. To do this, follow these steps:

- a. Have your partner sit quietly, remaining as relaxed as possible.
- b. Locate the pulse by placing your index and middle fingers over the radial artery on the anterior surface of the wrist. Do not use your thumb for sensing the pulse because you may feel a pulse coming from an artery in the thumb itself.
- c. Note the characteristics of the pulse. That is, could it be described as regular or irregular, strong or weak, hard or soft?
- d. To determine the pulse rate, count the number of pulses that occur in 1 minute. This can be accomplished by counting pulses in 15 seconds and multiplying that number by 4.

### Blood Pressure

Measure your lab partner's arterial blood pressure. To do this, follow these steps:

- a. Obtain a sphygmomanometer and a stethoscope.
- b. Clean the earpieces and diaphragm of the stethoscope with an alcohol wipe.
- c. Have your partner sit quietly with a bare arm resting on a table at heart level. Have the person remain as relaxed as possible.
- d. Locate the brachial artery at the above the elbow. Wrap the cuff of the sphygmomanometer around the arm so that its lower border is about 2.5 cm above the end of the elbow. Center the tube of the cuff in line with the brachial pulse.
- e. Palpate the radial pulse. Close the valve on the neck of the rubber bulb connected to the cuff, and pump air from the bulb into the cuff. Inflate the cuff while watching the sphygmomanometer and note the pressure when the pulse disappears. (This is a rough estimate of the systolic pressure.) Immediately deflate the cuff.
- f. Position the stethoscope over the brachial artery. Reinflate the cuff to a level 30 mm Hg higher than the point where the pulse disappeared during palpation.
- g. Slowly open the valve of the bulb until the pressure in the cuff drops at a rate of about 2 or 3 mm Hg per second.
- h. Listen for sounds (Korotkoff sounds) from the brachial artery. When the first loud tapping sound is heard, record the reading as the systolic pressure. This indicates the pressure exerted against the arterial wall during systole.
- i. Continue to listen to the sounds as the pressure drops, and note the level when the last sound is heard. Record this reading as the diastolic pressure, which means the constant arterial resistance.
- j. Release all of the pressure from the cuff.

## Procedure B—Observing Changes

1. Repeat the procedure in Part A and determine the pulse rate and blood pressure in each of the following conditions for two members of your group:
  - a. immediately after standing
  - b. 3-5 minutes after standing quietly
  - c. immediately after 1 lap of the track (omit if the person has health problems).
  - d. 3-5 minutes after lap of the track has ended.
  - e. Immediately after 2 minutes of stair climbing (omit if the person has health problems).
  - f. 3-5 minutes after stair climbing has ended.
2. Switch partners and repeat.

## Observations:

### Part A: Pulse Rate

Enter your observations of pulse characteristics and pulse rates in the table. Take two readings per person – one by radial and one by carotid artery.

Test Subject	Pulse Characteristics	Pule Rate 1	Pulse Rate 2

### Part A: Blood Pressure

Test Subject	Blood Pressure

## Part B: Observing Changes

Person A:

Change	Heart Rate (BPM)	Breathing Rate (PM)	Blood Pressure (Sys/Dia)
immediately after standing			
3-5 minutes after standing quietly			
immediately after 1 lap of the track			
3-5 minutes after lap of the track has ended.			
Immediately after 2 minutes of stair climbing			
3-5 minutes after stair climbing has ended.			

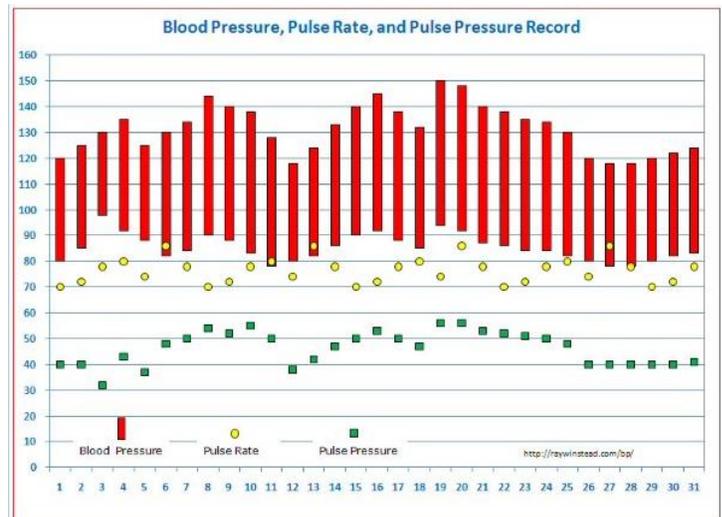
Person B:

Change	Heart Rate (BPM)	Breathing Rate (PM)	Blood Pressure (Sys/Dia)
immediately after standing			
3-5 minutes after standing quietly			
immediately after 1 lap of the track			
3-5 minutes after lap of the track has ended.			
Immediately after 2 minutes of stair climbing			
3-5 minutes after stair climbing has ended.			

## Graphing Observations

Create a graph to outline the change in blood pressure and heart rate during the different intervals of rest and activity.

Activity/Rest will go on the independent variable and you will need a scale for the dependant variable... something like the graph below. Remember to state your units of measure and provide a good title.



## Discussion:

Summarize the effects of body position and exercise on blood pressure and heart rate.

Summarize any correlations between pulse rate, breath rate and blood pressure from any of the experimental conditions.

The time needed to return to a resting pulse rate is called cardiac recovery time. Why is cardiac recovery time lower in a finely tuned athlete than in a physically unfit person?

What are some dangers of high blood pressure?

## Extension:

It is easy to think of the various systems in our bodies as single entities, but you have seen time and time again how one system relies on the other. It is this interconnectedness that allows our bodies to function properly.

For each scenario below, indicate how each of the three systems, digestive, circulatory, and respiratory, all make a contribution to the proper functioning of our bodies.

1. Heart rate increases during exercise.
2. An adrenaline rush before taking your driving test.
3. Oxygen levels decrease while sleeping.